Sept. 19, 1944. M. MARGOLIN 2,358,342

RESILIENT ARCH SUPPORT

Filed Dec. 13, 1940

Fig. 1

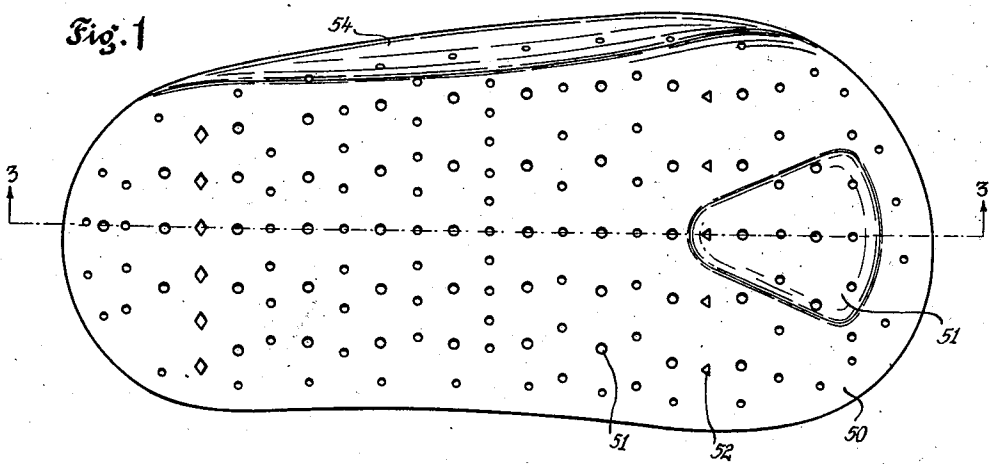


Fig. 2

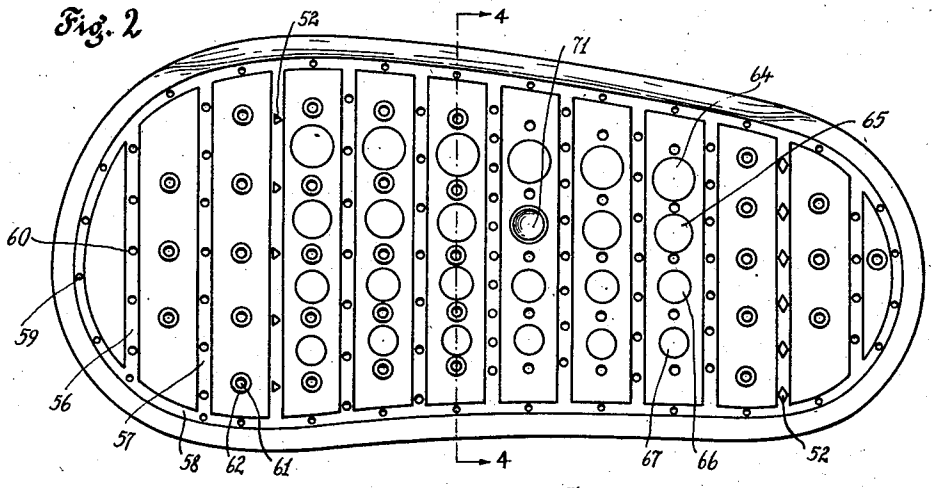


Fig. 3

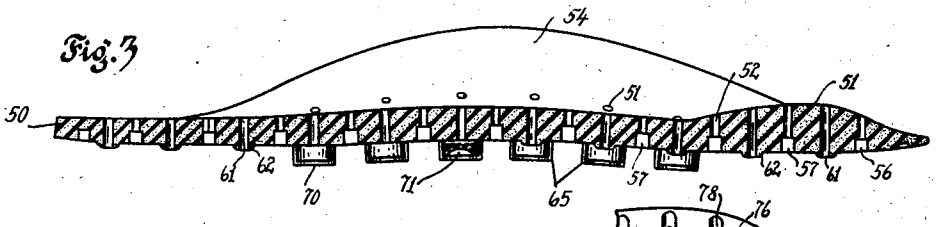


Fig. 4

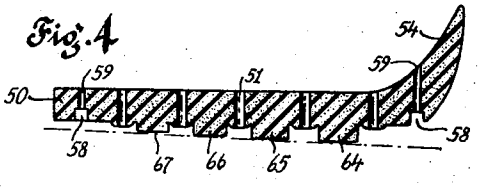
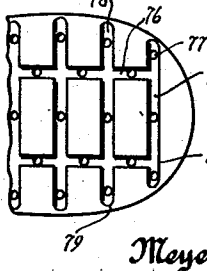


Fig. 5



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RESILIENT ARCH SUPPORT

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2 Claims. (Cl. 36—3)

My invention relates to an arch support and more specifically to an arch supporting device comprising expanded rubber which is provided with such construction as to make possible a constant and forced breathing in the shoe.

The arch support of my invention generally comprises an integrally molded resilient and flexible material which is highest along the center of its longitudinal axis and tapers down from there to a feather edge thickness at its periphery.

A rigid member may be employed along the longitudinal axis in order to provide the necessary rigid base support for the arch support. Across the areas of appreciable thickness in this device extend transverse grooves of substantial width having a substantially rectangular cross-section. When this device is employed in the shoe and is flexed in the act of walking, the grooves are alternately expanded and contracted to provide a forced breathing which forces air circulated thereby up through perforations which extend through the thickness of this arch support and which perforations are located over the entire areas of this arch support and spaced at a small distance one from the other.

The arch support above generally described may be given an upper cover of leather which is perforated in such a manner so that the perforations correspond to the perforations in the resilient material which comprises the arch support. In this way the breathing is not interfered with. The arch support is adapted to be placed within the ordinary shoe in order to correct the positioning of the arch of the wearer. It also acts as a resilient cushion to the foot of the wearer and may carry in the metatarsal region an arch support which consists in an integrally molded raised area of rubber.

At the side of my arch support and extending upwardly and around the long arch of the foot is an extension to afford support for the longitudinal arch. In order to gradually build up the support in this particular area, I provide recesses in the form of holes larger than the ordinary air perforations located in this area which are adapted to receive projections which are carried by cookies. These cookies may be added on to the arch support to build up the thickness to get additional height in this area. These cookies may be in the form of relatively thin resilient wafers which carry projections on their underside and recesses on their upper side so that a multiplicity of such cookies may be superimposed one upon the other in order to build up and provide the ultimate desired thickness in this particular area as shown in my Patent Number 2,207,632.

In order to facilitate this forced breathing I may provide communicating grooves or arteries which connect the transverse grooves with the perforations through the arch support so that the air that is compressed and forced from these transverse grooves in the act of walking may be quickly and fully dispersed through said grooves or arteries, through said perforations and hence in contact with the foot of the wearer. These grooves or arteries may be in the form of grooves molded in the bottom surface of the resilient material such as rubber or they may be in the form of channels in the interior of the molded material, said channels extending through the molded material and connecting the respective grooves and perforations.

I have found that these channels may be from a commercial standpoint formed by molding them as grooves on the bottom surface. When I employ these connecting grooves or arteries, I may or may not use the reinforcing bosses at the ends of the perforations since with these grooves the bosses may not be necessary for proper breathing action.

Although I have specifically set forth transverse grooves having spaced walls as the means by which I obtain the forced breathing, I also propose the use of grooves having spaced relatively parallel walls of varying forms. By means of these grooves of varying forms and curvatures I may take advantage of different flexing actions of the insole and hence obtain an additional or superior forced breathing action.

An additional feature of the arch support of my invention consists of the use of means which may be integrally formed therewith for engaging said arch support with an insole. For example, I may form on the under side of said arch support downwardly depending projections of rubber-like material which are adapted to fit into and be engaged by corresponding openings in the insole directly below the arch support.

This engaging means may take the place of a plurality of downwardly depending projections or a single projection in the form of, for example, a bar of appreciable length adapted to fit into a slot-shaped opening in the insole.

The arch support of my invention, as will be described more specifically hereinafter, may comprise, in addition to an arch support per se, a heel support and a meta-tarsal support. The features of engaging the arch support with the insole may apply to this extended member which

comprises both the heel support and the metatarsal support.

Still a further feature of my invention comprises the use on the bottom of the arch support described hereinabove of a plurality of downwardly depending lugs which are adapted to rest upon the top surface of the insole positioned beneath the support, these downwardly depending lugs spacing the arch support from the insole and comprising a rubber-like material. Because of the resilience of these downwardly depending lugs a suppleness and resilience is given to the arch support, and further, an air space is provided between the arch support and the insole which air space constitutes a pumping means for providing a flow of air into the foot area because of the fact that alternate compression and decompression of these downwardly depending resilient lugs causes the air space to be alternately diminished and enlarged. The passage for the air pumped is provided through perforations located in the arch support.

These downwardly depending resilient lugs may be of uniform size and dimension, but I prefer to provide a variant size thereof so that the lugs adjacent the long arch support which extends upwardly and outwardly from this arch support are longer and of greater diameter. Thus I provide a lift and a greater resilience in that area. As will be described more specifically hereinafter, this size and length variance is effected by a graduated increase in size of said resilient lugs.

In addition to providing grooves having closed-in walls, I may also provide interconnected grooves to provide a different type of air flow through the arch support.

Accordingly, it is the object of my invention to provide a novel arch supporting member for a shoe consisting of a resilient material such as expanded rubber, said arch support being provided with means for causing forced breathing therethrough.

It is a further object of my invention to provide a novel cellular rubber arch support with a rigid support positioned therein.

It is a further object of my invention to provide a novel arch support in which grooves are positioned on the flexible portions in order to provide forced breathing through perforations located through the arch support area.

Figure 1 is a plan view of the arch support of my invention.

Figure 2 is a bottom view of the modified arch support shown in Figure 1.

Figure 3 is a cross section taken along line 3—3 of Figure 1.

Figure 4 is a cross section taken along line 4—4 of Figure 2.

Figure 5 is a bottom view of a section of a modified form of the arch support of my invention.

Hitherto, these supports have been made of a metal frame work covered with leather and such arch support is decidedly uncomfortable for the foot. A rubber support has been impractical largely because of the problem of foot comfort. By means of the system of forced breathing which I effect as shown by the grooves and perforations, I have obviated the difficulties hitherto experienced in this art. All portions of the base area of my arch support that are flexed carry the transverse grooves which, when flexed, force air through the perforations to the foot.

Referring now specifically to Figure 1, I show an arch support, generally denoted as **50**, having perforations **51** and **52** which may be of various shapes extending therethrough to provide an air flow from the air pumping construction beneath the arch support to the foot area above the arch support. Mounted on, and preferably molded integrally with the arch support **50**, is a metatarsal support **51** upwardly and outwardly extending from the inside of the arch support **50** and a long arch support **54** adapted to support the long arch of the foot.

On the bottom of the arch support **50**, as shown in Figure 2, are transverse grooves **56** and **57**, and peripherally extending groove **58** which interconnects the various transverse grooves **56** and **57**. Perforations **59** are located in the peripheral groove. Perforations **60** are located in the transverse grooves. Additionally or alternately I may provide perforations **61** located on the arch support intermediate said grooves, said perforations **61** being preferably reinforced by bosses **62** to prevent the closing of said perforations and to permit air to flow therethrough from the bottom of the arch support. The perforations may be of various shapes as desired. Downwardly depending from the bottom of said arch support are lugs **64**, **65**, **66**, and **67** which are adapted to rest on the insole directly beneath said arch support. These lugs may vary in diameter and length, the lugs of greatest diameter and length being adjacent the upwardly and outwardly extending arch **54**, as more specifically shown in Figure 4.

The bottom of these lugs may be flat as shown at **70** in Figure 3, or the bottom may be dished out in cup-like form **71** to increase the adherence of the lug to the insole and to provide a further air pumping action during the compression and decompression of the lugs in the act of walking.

By graduating the diameter and length of the lugs as shown in Figures 2 and 4, I provide a better support for that area of the foot which particularly needs the support, meaning particularly that area at and adjacent the long arch.

In Figure 5 I show a modified form of groove which may be employed in the bottom of my arch support which modification can be utilized in the heel of any of the preceding species, and in this form I provide interconnected transverse and longitudinal grooves **75** and **76** respectively which are interconnected and in which are located perforations **77** adapted to transmit air therefrom to the upper portion of the arch support and to the interior of the foot.

As shown, these transverse and longitudinal grooves may have closed end walls **78**, **79**, and **80** to increase the effect of forcing the air from the grooves through the perforations **77**.

The provision of these downwardly depending lugs secures not only the accurate and permanent positioning of the arch support in the shoe, but also provides a greater resilience therefor because of the increased resilience area provided by the resilient lugs. The downwardly depending lugs further increase the breathing propensities of the construction since under compression in the act of walking, the lugs are compressed and tend to compress the walls of the adjacent grooves, causing air to flow therethrough and to increase the pumping action of the unit.

By the constructions here shown, I provide a novel arch support which, as shown, may comprise an arch area and heel area, and on which I may provide a meta-tarsal support. The resilient breathing nature of my arch support construction provides increased foot comfort both

from the standpoint of correct foot posture and because of the increased resilience which I provide.

Certain modifications of my invention will be apparent to those skilled in the art and I intend to be limited not by the specific forms set forth by way of example above, but only by the appended claims.

I claim:

1. An arch and heel support comprising a soft and resilient material, said support comprising an arch area and a heel area, a soft and resilient long arch support extending upwardly and outwardly from said arch area, transverse grooves extending across the bottom of said arch and heel support, a groove locatad on the bottom of said support extending around the periphery of said support, said transverse grooves opening into said peripheral groove so that said peripheral groove connects said transverse grooves.

2. An arch and heel support comprising a soft and resilient material, said support comprising an arch area and a heel area, a soft and resilient long arch support extending upwardly and outwardly from said arch area, lugs downwardly depending from said arch area, said lugs being adapted to rest on an insole, said lugs being of greater length and thickness in the arch area adjacent said long arch support, transverse grooves extending across the bottom of said arch and heel support, a groove located on the bottom of said support extending around the periphery of said support, said transverse grooves opening into said peripheral groove so that said peripheral groove connects said transverse grooves.

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